



(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**16.07.2003 Bulletin 2003/29**

(51) Int Cl.7: **B65G 13/10, B65G 47/54**

(21) Application number: **01201661.4**

(22) Date of filing: **08.05.2001**

(54) **Conveyor assembly**

Fördereinheit

Ensemble de convoyage

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**

(30) Priority: **16.06.2000 FI 20001435**

(43) Date of publication of application:  
**02.01.2002 Bulletin 2002/01**

(73) Proprietor: **Bevesys Oy**  
**45100 Kouvola (FI)**

(72) Inventors:  
• **Auno, Antti**  
**47710 Jaala (FI)**

• **Paavola, Hannu**  
**45130 Kouvola (FI)**

(74) Representative: **Heinänen, Pekka Antero et al**  
**Heinänen Oy,**  
**Patenttitoimisto/Patent Agency,**  
**Annankatu 31-33 C**  
**00100 Helsinki (FI)**

(56) References cited:  
**US-A- 3 804 230**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

[0001] The present invention relates to an assembly for conveying and rotating/transferring articles such as individual containers or beverage bottle cases or the like in a direction lateral to the travel direction thereof, the assembly comprising two or more substantially cylindrical conveyor rolls that are parallel to each other and aligned longitudinally in the travel direction of the articles, the conveyor rolls being adapted rotatable about their axes in order to effect the rotation of said articles or transfer thereof in the lateral direction, plus one or more conveyor belts or the like means for transferring said articles in the longitudinal direction of said conveyor rolls, the conveyor belts being adapted to pass over belt support rolls.

[0002] Conveyor assemblies are used as the horizontal infeed equipment of individual container-like articles such as beverage bottles and cans in a redemption machine. Conventional infeed equipment are generally implemented using two horizontal, in parallel running belts that are driven by means of belt support rolls or the like elements. The belts are naturally aligned to run in the travel direction of the articles and may form a small angle with each other so that the article can rest on both sides thereof on both belts. This type of infeed assembly must be complemented with a separate device serving to rotate the container item about its longitudinal axis so that a barcode reader can identify the bar code printed on the item. As such devices are equipped with solid and continuous belts, a rotating means cannot be made to operate through the belts, but instead, the rotating means is implemented using a separate element adapted to rotate transverse to the travel direction of the conveyor, generally in the interbelt gap.

[0003] Another solution is described in FI Pat. Appl. No. 19991724 (corresponding to EP-A-1 081 661, published 07/03/2001), wherein is disclosed an infeed conveyor in which the forward-feeding conveyor means are formed by orthogonally to the travel direction placed infeed elements and the rotating means are disk-like rotary elements rising up in the gaps between the infeed elements.

[0004] US-A- 3 804 230 describes an assembly according to the preamble of claim 1.

[0005] These and other known conveyors that also are required to provide the rotation of the article being transferred in a direction orthogonal to the travel direction, means operating independently from each other must be used to implement two movements in orthogonal directions. Hence, these conveyor constructions typically occupy a large space and a plurality of separate units that must be adapted to cooperate.

[0006] It is an object of the present invention to provide a conveyor assembly free from the above-described disadvantages. The assembly according to the invention is characterized in that conveyor belts are adapted to pass over belt support rolls and in that each

one of the conveyor rolls has adapted thereon at least one conveyor belt running in the direction of the longitudinal axis of the conveyor roll and that the belt support rolls are designed into an integral structure of the roll so that the support rolls will rotate with the conveyor roll and that the conveyor belts are arranged to run at least substantially in the plane of the cylindrical envelope surface of each conveyor roll. This kind of conveyor roll construction with an integral conveyor belt is extremely compact thus saving space in the machine. Moreover, the construction is rather simple to fabricate.

[0007] A preferred embodiment of the invention is characterized in that each one of the conveyor rolls has one endless conveyor belt and that the belt support rolls are mounted on bearings running at the ends of the conveyor roll.

[0008] Another preferred embodiment of the invention is characterized in that said conveyor rolls operate pairwise in parallel and that, in the rest position of the conveyor rolls, the surfaces of the conveyor belts are arranged to form an essentially V-shaped angle with each other, whereby an article such as a bottle, can or the like to be transferred sinks at least partially into the recess formed by the conveyor rolls and the conveyor belts come into contact with the article.

[0009] A still another preferred embodiment of the invention is characterized in that a plurality of the conveyor rolls operate in a parallel disposition and that, in the rest position of the conveyor rolls, the conveyor belts are arranged to run along the conveyor roll areas substantially forming the top surface of the conveyor rolls, whereby the article being transferred such as a beverage bottle case moves forward on the conveyor belts when they are running, while the rotation of the conveyor rolls makes the article to move sideways on the conveyor rolls.

[0010] In the following, the invention will be described in greater detail with the help of a preferred embodiment by making reference to the appended drawings in which

FIG. 1 is obliquely from above taken view of a preferred embodiment of a conveyor construction of according to the invention;

FIG. 2 is an axonometric sectional view of the power transmission of the conveyor; and

FIG. 3 is sectional side view of the same power transmission.

[0011] A conveyor according to the invention comprises two or more hollow conveyor rolls 15 operating in parallel. In FIG. 1 is shown an exemplifying embodiment having two conveyor rolls arranged in parallel. The surfaces of the conveyor rolls 15 have adapted running thereon endless conveyor belts 12, whose load-carrying surfaces are dimensioned to run essentially in the same plane with the cylindrical outer surfaces of the conveyor

rolls. The conveyor belts 12 are arranged to form in the rest positions of the conveyor rolls 15 an essentially V-shaped angle with each other, whereby an article such as a bottle, can or the like sinks at least partially into the recess formed by the conveyor rolls and the conveyor belts 12 come into contact with the article on both sides thereof.

[0012] The conveyor belts are passed over belt support rolls 10 (see FIGS. 2 and 3) that are mounted at the ends of the conveyor rolls 15, possibly entirely or at least partially to the interior of the conveyor roll 4. The conveyor rolls 15 in turn are mounted on bearings 2 on the framework of the conveyor so that they can be rotated about the conveyor roll shafts 4. Each one of the shafts 4 of the conveyor rolls 15 is rotatably mounted on the conveyor roll body 1. For the rotation of the conveyor rolls, toothed gearwheels 3 are mounted on the conveyor roll shafts 4. Into the inner bore of the conveyor roll shafts 4 is mounted on bearings a second shaft 8 having a straight-toothed gearwheel 7 mounted on its one end, while the other end of the roll 15 is provided with a bevel gear 13. The cooperating bevel gear 14 is mounted on the shaft 11 of the belt support roll 10. Onto the framework of the conveyor are mounted two drive motors 16 and 17. One of the motors serves to drive the conveyor roll shafts 4 and the other is connected to drive the inner shafts 8.

[0013] The function of the conveyor according to the invention is as follows: drive power from the first motor 17 is transmitted to the gearwheels 3 mounted on the shafts 4 of the conveyor rolls 15. This motor is capable of rotating both rolls 15 and, hence, any articles such as bottles or cans (not shown) resting thereon. Drive power from the second motor 16 is transmitted to the inner shafts 8. The bevel gears 13, 14 mounted to the other ends of these shafts 8 transmit the drive power to the belt support rolls 10 that in turn move the belts 12. In this fashion, controlling the first motor 16 allows articles to be moved in the travel direction of the belts 12, while the other motor 17 can be used to rotate the articles about their longitudinal axis. Both motors are provided with a bidirectional control. Accordingly, the conveyor construction according to the invention is characterized by having the belts 12 designed integral with the conveyor roll structure. In summary, when conveyor rolls are rotating, the belts do rotate with the conveyor rolls but are not actuated in their longitudinal travel direction. Respectively, when the belts are moving in their travel direction, the conveyor rolls are kept stationary.

[0014] The same principle may be utilized, e.g., in the transfer of box-shaped articles such as beverage bottle cases. By way of placing a plurality of conveyor rolls 15 in parallel, it is possible to obtain a conveyor, wherein cases can be moved in the longitudinal direction by running the belts 12 and in the lateral direction by rotating the conveyor rolls 15. Advantageously, the conveyor belts 12 are herein adapted to run along the conveyor roll areas that in the stopped position of the rolls sub-

stantially form the top surface of the rolls, whereby the article such as a beverage bottle case moves forward on the conveyor belts 12 when they are running, while the rotation of the conveyor rolls 15 makes the article to move sideways on the conveyor rolls. This kind of arrangement is useful, among other applications, at conveyor junctions where different cases must be sorted to travel toward different target positions.

[0015] To those skilled in the art, it is obvious that the invention is not limited to the above-described exemplary embodiments, but rather, may be modified within the scope of the appended claims.

## 15 Claims

1. Assembly for conveying and rotating/transferring individual containers or beverage bottle cases or the like articles as well as moving or, laterally in a direction orthogonal to the travel direction of the articles, transferring the same, the assembly comprising two or more substantially cylindrical conveyor rolls (15) that are parallel to each other and aligned longitudinally in the travel direction of the articles, the conveyor rolls being adapted rotatable about their axes in order to effect the rotation of said articles or transfer thereof in a direction transversal to the axis of the conveyor rolls, plus means for transferring said articles in the longitudinal direction of said conveyor rolls (15), **characterized in that** conveyor belts (12) are adapted to pass over belt support rolls (10), and **in that** each one of the conveyor rolls (15) has adapted thereon at least one conveyor belt (12) running in the direction of the longitudinal axis of the conveyor roll and that the belt support rolls (10) are designed into an integral structure of the conveyor roll (15) so that the support rolls will rotate with the conveyor roll and that the conveyor belts (12) are arranged to run at least substantially in the plane of the cylindrical envelope surface of each conveyor roll (15).
2. Assembly according to claim 1, **characterized in that** each one of said conveyor rolls (15) has one endless conveyor belt (12) and that the belt support rolls (10) are mounted on bearings running at the ends of the conveyor roll (15).
3. Assembly according to claim 1 or 2, **characterized in that** said conveyor rolls (15) operate pairwise in parallel and that, in the rest position of the conveyor rolls, the surfaces of the conveyor belts (12) are arranged to form an essentially V-shaped angle with each other, whereby an article such as a bottle, can or the like to be transferred sinks at least partially into the recess formed by the conveyor rolls and the conveyor belts (12) come into contact with the article on both sides thereof.

4. Assembly according to claim 1 or 2, **characterized in that** a plurality of the conveyor rolls (15) operate in a parallel disposition and that, in the rest position of the conveyor rolls, the conveyor belts (12) are arranged to run along those conveyor roll areas that in the rest position of the rolls substantially form the top surface of the conveyor rolls, whereby the article such as a beverage bottle case moves forward on the conveyor belts (12) when they are running, while the rotation of the conveyor rolls makes the article to move sideways on the rolls.

#### Patentansprüche

1. Einheit zum Fördern und Drehen/Überführen einzelner Behälter oder Kästen von Getränkeflaschen oder ähnlicher Artikel sowie um diese zu bewegen oder seitlich in eine Richtung orthogonal zur Laufrichtung der Artikel zu überführen bzw. zu transportieren, wobei die Einheit zwei oder mehr im wesentlichen zylindrische Förderrollen (15) umfasst, die parallel zueinander sich befinden und in Laufrichtung der Artikel längs ausgerichtet sind und die Transportrollen um ihre Achsen drehbar sind, um die Drehung dieser Artikel oder deren Überführung in einer Richtung quer zur Achse der Transportrollen vorzunehmen plus Mittel zum Transportieren der Artikel in der Längsrichtung dieser Transportrollen (15), **dadurch gekennzeichnet, dass** Transportbänder (12) so eingerichtet sind, dass sie über Bandstützrollen (10) laufen und dass auf jeder der Transportrollen (15) wenigstens ein Förderband (12) vorgesehen ist, das in Richtung der Längsachse der Transportrolle läuft, und dass die Bandstützrollen (10) für eine integrale Struktur der Transportrolle (15) ausgelegt sind, so dass die Stützrollen mit der Transportrolle sich drehen werden, und die Förderbänder (12) so angeordnet sind, dass sie im wesentlichen in der Ebene der zylindrischen Hüllfläche jeder Transportrolle (15) laufen.
2. Einheit nach Anspruch 1, **dadurch gekennzeichnet, dass** jede der Transportrollen (15) über ein endloses Förderband (12) verfügt und dass die Bandstützrollen (10) auf Lagern, die an den Enden der Transportrolle (15) laufen, montiert sind.
3. Einheit nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** diese Transportrollen (15) paarweise parallel betrieben werden und dass in Ruhestellung der Transportrollen die Oberflächen der Förderbänder (12) so angeordnet sind, dass sie einen im wesentlichen V-förmigen Winkel zueinander bilden, wodurch ein zu transportierender Artikel wie eine Flasche, Dose oder dergleichen wenigstens teilweise in die durch die Transportrollen geformte Vertiefung sinkt, und die Förderbänder (12) in Kon-

takt mit dem Artikel auf seinen beiden Seiten kommen.

4. Einheit nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** eine Vielzahl von Transportrollen (15) in paralleler Anordnung betrieben werden und dass in Ruhestellung der Transportrollen die Förderbänder (12) so angeordnet sind, dass sie längs derjenigen Transportrollenbereiche laufen, die in der Ruhestellung der Rollen im wesentlichen die Oberfläche der Transportrollen bilden, wodurch der Artikel wie ein Kasten für Getränke, Flaschen sich nach vorne auf den Transportbändern (12) bei deren Lauf bewegt, während die Drehung der Transportrollen veranlasst, dass der Artikel sich seitwärts auf den Rollen bewegt.

#### Revendications

1. Ensemble destiné à transporter et à faire tourner/transférer des récipients individuels ou des casiers à bouteilles de boisson ou des articles similaires, ainsi qu'à les déplacer ou à les transférer latéralement, dans une direction orthogonale à la direction de transport des articles, l'ensemble comprenant au moins deux rouleaux pratiquement cylindriques (15) de convoyeur, parallèles l'un par rapport à l'autre et alignés longitudinalement dans la direction de transport des articles, les rouleaux de convoyeur étant conçus pour tourner autour de leur axe, afin d'effectuer la rotation desdits articles, ou leur transfert, dans une direction transversale à l'axe des rouleaux de convoyeur, plus un moyen pour transférer lesdits articles dans la direction longitudinale desdits rouleaux (15) de convoyeur, **caractérisé en ce que** des courroies (12) de convoyeur sont conçues pour passer par-dessus des rouleaux (10) de soutien de courroie, et **en ce que** chacun des rouleaux (15) de convoyeur est équipé d'au moins une courroie (12) de convoyeur, qui avance dans la direction de l'axe longitudinal du rouleau de convoyeur, **en ce que** les rouleaux (10) de soutien de courroie sont conçus dans une structure intégrale du rouleau (15) de convoyeur, si bien que les rouleaux de soutien tourneront avec le rouleau de convoyeur, et **en ce que** les courroies (12) de convoyeur sont disposées pour avancer, au moins sensiblement, dans le plan de la surface d'enveloppe cylindrique de chaque rouleau (15) de convoyeur.
2. Ensemble selon la revendication 1, **caractérisé en ce que** chacun desdits rouleaux (15) de convoyeur est équipé d'une courroie sans fin (12) de convoyeur et **en ce que** les rouleaux (10) de soutien de courroie sont montés sur des coussinets, qui tourment aux extrémités du rouleau (15) de convoyeur.

3. Ensemble selon la revendication 1 ou 2, **caracté-**  
**risé en ce que** les rouleaux (15) de convoyeur fonc-  
tionnent par paires parallèles et **en ce que**, dans la  
position de repos des rouleaux de convoyeur, les  
courroies (12) de convoyeur sont disposées pour  
former un angle glahalement en forme de V les  
unes avec les autres, de façon à ce qu'un article  
comme une bouteille, une canette ou un autre réci-  
pient puisse être transféré au moins partiellement  
calé dans la cavité formée par les rouleaux de con-  
voyeur et pour que les courroies (12) de convoyeur  
se mettent en contact avec l'article sur ses deux cô-  
tés.
4. Ensemble selon la revendication 1 ou 2, **caractéri-**  
**sé en ce qu'une** pluralité de rouleaux (15) de con-  
voyeur fonctionnent dans une disposition parallèle  
et **en ce que**, dans la position de repos des rou-  
leaux de convoyeur, les courroies (12) de con-  
voyeur sont disposées pour avancer le long de ces  
surfaces de rouleau de convoyeur qui, dans la po-  
sition de repos des rouleaux, forment pratiquement  
la surface supérieure des rouleaux de convoyeur,  
de sorte que l'article, tel qu'un casier à bouteilles de  
boisson, se déplace vers l'avant sur les courroies  
(12) de convoyeur lorsqu'elles avancent, tandis que  
la rotation des rouleaux de convoyeur fait se dépla-  
cer latéralement l'article sur les rouleaux.

5

10

15

20

25

30

35

40

45

50

55

5

Fig 1

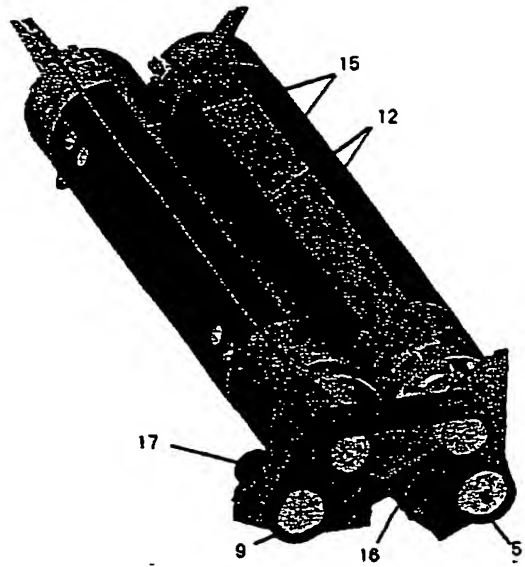


Fig.2

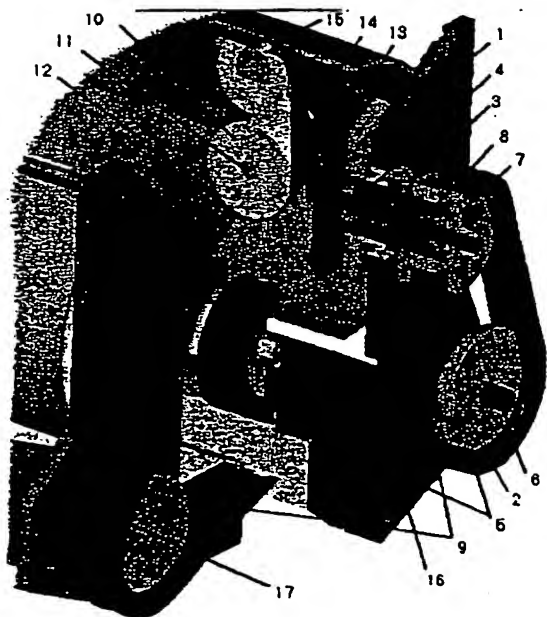


Fig. 3

